

OBSERVATIONS ON SOME UNCOMMON VASCULAR AQUATIC PLANTS IN NEW ENGLAND¹

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During the summers of 1971–1976 a number of uncommon taxa of vascular aquatic plants was discovered in New England. Pertinent information concerning these and their ranges are given here. Locations for the specimens referred to are listed at the end of the discussion of each taxon. Specimens have been deposited in the herbaria of Boston State College and various other institutions. Alkalinity data are in addition to that of Hellquist (1975).

Potamogeton filiformis Pers.

Potamogeton filiformis var. *borealis* (Raf.) St. John was found at numerous locations in Aroostook County, Maine, one location in Coos County, New Hampshire, and four locations in Caledonia County, Vermont. The only previously reported and verified Vermont specimens are from Otter Creek, Weybridge and Lake Champlain at North Hero and Charlotte. These collections are on deposit in the Pringle Herbarium of the University of Vermont.

Three of the four ponds in Caledonia County also contained the broader-leaved *Potamogeton filiformis* var. *macounii* Morong, and these collections are new records for New England. A specimen reported (Hellquist, 1972) from Lombard Pond, Colebrook, New Hampshire, as var. *borealis*, and a specimen of *P. filiformis* var. *borealis* collected by G. D. Chamberlain (2278) from Butterfield Lake, Caswell, Aroostook County, Maine, may both be var. *macounii*.

The Vermont plants are from shallow water (60.0 cm.). The lower leaves are slightly broader than the upper leaves, and the stipules of the lower leaves on some plants are inflated up to 2.9 mm. in width, as is *P. vaginatus* Turcz., but they are shorter in length (maximum 7.4 mm.). Stipules higher on the stem are longer (maximum 14.0 mm.). Fruits from the broader-leaved plants are identical with those of var. *borealis*.

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COLLECTION LOCATIONS: *Potamogeton filiformis* var. *borealis*.

Maine: AROOSTOOK CO.: Butterfield Lake, Caswell, 7779; Pierce Lake, Caswell, 4470; pond immediately east of Pierce Lake, Caswell, 4586; Page Pond, Fort Fairfield, 7734; Caribou Lake, Washburn, 4666. **New Hampshire:** COOS CO.: Lombard Pond, Colebrook, 6219. **Vermont:** CALEDONIA CO.: Harvey Lake, Barnet, 8726; Warden Pond, Barnet, 4369, 9795; Ewell Pond, Peacham, 8434, 9787; Keiser Pond, Peacham, 8436, 9774.

Potamogeton filiformis var. *macounii*. **Vermont:** CALEDONIA CO.: Warden Pond, Barnet, 6421, 9816; Ewell Pond, Peacham, 8426, 9817; Keiser Pond, Peacham, 8455, 9775.

Potamogeton vaginatus Turcz.

Potamogeton vaginatus has been reported in eastern Canada, primarily from Newfoundland and Prince Edward Island (St. John, 1916). It was thought to be absent from New England, but it occurs to the west in the St. Lawrence River and the Finger Lakes region of New York. Muenscher (1944) indicates its presence in northern Maine, but I have seen no voucher specimen.

During the summer of 1973, I discovered an extensive population of plants that appear to be *Potamogeton vaginatus* growing at a depth of 1.5 meters in Prestile Stream, north of the dam at Mars Hill, Aroostook County, Maine. The leaves are broad (lower leaves 1.5 mm. and the upper leaves 0.6 mm. wide) and blunt-tipped. Stipule length is up to 4.5 cm. and twice as great as stem width. The spikes consist of seven to nine whorls of flowers. No fruits were found; this species rarely produces fruits.

This site was revisited during the summer of 1976. The population north of the dam was destroyed by lowering the water level for a period of time followed by flooding of the area. In the rapids south of the dam a few patches of *Potamogeton vaginatus* were observed. Here the plants were shorter in length — 25.0 cm. as compared to 1.0 m. north of the dam.

Alkalinity studies on this site, one in New York and 13 in Michigan indicate that *Potamogeton vaginatus* inhabits highly alkaline water. The results are recorded in Tables 1 and 2.

COLLECTION LOCATIONS: **Maine:** AROOSTOOK CO.: Prestile Stream pond north of the dam, Mars Hill, 7798; Prestile Stream rapids south of the dam, Mars Hill, 11397.

Potamogeton hillii Morong

Fernald (1932) considered *Potamogeton hillii* to be one of the

rarer species of *Potamogeton*, occurring in ten locations in five states. Since publication of Fernald's monograph, additional locations for this species have been reported, mainly from New England, New York, and Michigan. The most recent report from New England is that of Weber (1940) from Karner Brook, South Egremont, Massachusetts.

A survey of the previously reported New England collection sites has failed to reveal *Potamogeton hillii*. The population I discovered in 1972 at Cone Brook, Richmond, Massachusetts, was revisited in 1973 and the plant was found to be scarce. However, in 1974, I found it to be abundant. The area at South Stream, Pownal, Vermont, where the species was extremely abundant in 1973, was completely devoid of the plant in 1974. It appears that this species is sporadic and may be common only occasionally at certain locations. The other populations of *P. hillii* in Massachusetts are extensive and weedy.

My observations of *Potamogeton hillii* indicate that it is usually found in highly alkaline (Tables 1 & 2) shallow, muddy waters of ponds and streams. The populations at Tom Ball Brook, Alford, Massachusetts, are in water as deep as 1.5 meters, where its growth habit resembles that of deep-water *P. strictifolius*. In both shallow and deep water *P. hillii* was found fruiting freely.

During July 1976, an extensive population of flowering *Potamogeton hillii*, which contained some immature fruiting plants, was located in a marshy pond along Muddy Brook north of Stoney Brook Road, Great Barrington, Massachusetts. This population is of great interest as the leaves have three to seven veins instead of three as Haynes (1974) reports for the species. This makes recognition of this species and the hybrid *P. × longiligulatus* difficult as about one mile upstream there is a population of sterile five to seven veined plants, which appear to be *P. × longiligulatus*.

COLLECTION LOCATIONS: **Vermont:** BENNINGTON CO.: South Stream Pownal, 8140, 9670. **Massachusetts:** BERKSHIRE CO.: small pond west of Tom Ball Brook, West Street, Alford, 9694; marsh west of pond, west of Tom Ball Brook, Alford, 9697; Muddy Brook at Blue Hill Road, Great Barrington, 9946; marshy portion of Muddy Brook ca. 0.2 miles north of Stoney Brook Road, 9705; Cone Brook, Richmond, 4489; Fairfield Pond, Richmond, 11838; pond east of junction of Rossiter Road and West Road, Richmond, 11837; swamp along the south branch of Lily Brook at Bean Hill Road, Stockbridge, 9684.

Table 1.

Tolerance of taxa to total alkalinity (CaCO₃) from New England waters.

Species	Mean	Median mg/l CaCO ₃	Range	Number of Sites
<i>Potamogeton hillii</i>	141.9	116.0	86.0-290.0	10
<i>Potamogeton</i> × <i>longiligulatus</i>	96.0	90.0	71.5-130.0	4
<i>Potamogeton vaginatus</i>	103.5	103.5		
<i>Najas guadalupensis</i>	25.7	33.5	19.5- 41.5	5

Potamogeton X longiligulatus Fernald

This perplexing plant of alkaline waters (Tables 1 & 2) has received much attention by Voss (1972), Haynes (1974), and Haynes and Williams (1975). Fernald (1932) originally described *Potamogeton longiligulatus* from Newfoundland and indicated that no fruit was found. *Potamogeton longiligulatus* from Michigan is sterile and believed to be a hybrid between *P. strictifolius* and *P. zosteriformis* (Voss 1972, Haynes 1974). Studies by Haynes and Williams (1975) indicate this supposition to be the case. *Potamogeton longiligulatus* from East Creek, Orwell, Vermont, is apparently the hybrid between *P. strictifolius* and *P. zosteriformis*, as both species were present.

Ogden (1974) proposed the possibility of *Potamogeton hillii* as one of the parent species of *P. X longiligulatus* in eastern New York. This apparent hybrid was found in fruit by Smith and Ogden (45590), from Beebe Pond, Canaan, Columbia County, New York. During the summer of 1974, I visited this pond and a small number of fruits were collected. *Potamogeton zosteriformis* was abundant, and *P. hillii* was also found. *Potamogeton strictifolius*, however, was not found here.

I found *Potamogeton X longiligulatus* at Evarts' Pond, Windsor, Vermont, and at Mill Pond, South Egremont, Massachusetts. The parents of the two hybrid populations are not certain, as only one of the three possible parental species was found in each pond. *Potamogeton strictifolius* was common in Evarts' Pond, and *P. zosteriformis* was common at the Mill Pond. *Potamogeton hillii* was collected previously from both ponds and possibly may be one

Table 2.

Tolerance of taxa to total alkalinity (CaCO₃) from United States waters.

Species	Mean	Median mg/l CaCO ₃	Range	Number of Sites
<i>Potamogeton hillii</i>	128.5	121.0	86.0–290.0	24
<i>Potamogeton</i> × <i>longiligulatus</i>	120.7	121.0	71.5–162.0	10
<i>Potamogeton vaginatus</i>	142.3	131.0	86.5–390.0	15
<i>Najas guadalupensis</i>	83.3	46.5	19.5–215.0	11

of the parents. During 1974 an extensive population of *P.* × *longiligulatus* was found among fruiting *P. hillii* at Muddy Brook, Great Barrington, Massachusetts. *Potamogeton zosteriformis* was not located although it appeared to be the other parent. The stipules of this hybrid were brown, slightly fibrous, and thus similar to those of *P. hillii*. The leaves are broad (2.9–3.6 mm.) with five to seven veins. Plants of this particular population appear to be similar to *P. hillii* and may be a backcross of the hybrid with *P. hillii*.

One of the supposed parents of some of the *Potamogeton* × *longiligulatus* hybrids from the eastern United States (*P. strictifolius*) rarely fruits, while *P. hillii* fruits abundantly. This may help to substantiate the parentage, particularly for the Beebe Pond, New York, population which was found in fruit.

Potamogeton × *longiligulatus* is known to be a hybrid of *P. strictifolius* and *P. zosteriformis* in Michigan. However, in New England and eastern New York more than one set of parents may give rise to a hybrid of the same description. None of the three proposed parents has been reported from Newfoundland where the type specimen was collected. In an unsuccessful attempt during 1976 to clarify the hybrid parentage of this taxon, ponds south of Flowers Cove, Newfoundland, were investigated for the holotype population. Perhaps the name *P.* × *longiligulatus* should not be utilized for all the different possible hybrids.

COLLECTION LOCATIONS: **Vermont:** ADDISON CO.: East Creek, Orwell, 8288. WINDSOR CO.: Evarts' Pond (Lake Runnemedede), 4462. **Massachusetts:** BERKSHIRE CO.: Muddy Brook south of Blue Hill Road, Great Barrington, 9704, 9947.

Potamogeton lateralis Morong

This species is one of the rarest pondweeds in the United States. Fernald (1932) noted only two locations from New England. These localities were the Charles River in Dedham and Needham, Massachusetts, and in Salisbury, Connecticut. I discovered *Potamogeton lateralis* in a small pond in Lancaster, New Hampshire, where it was extremely abundant, forming an extensive mat over most of the pond. The leaves were narrow (0.5–0.9 mm.) and acute-tipped. Sterile plants with floating leaves and fruiting plants without floating leaves were found. The fruits were similar to the isotype specimen in the Gray Herbarium. *Potamogeton lateralis* was not observed here in 1973, but in 1974 a few specimens were located. The sterile plants without floating leaves could easily be confused with *P. vaseyi*. This confusion would tend to support the statement of Ogden (1974), "Apparently closely related to *P. vaseyi*, it may be merely a variant of that species."

COLLECTION LOCATION: **New Hampshire:** COOS CO.: small unnamed pond along the north side of U. S. Route 2 ca. ¼ mile east of Vermont state line, Lancaster, 6387.

Najas guadalupensis (Spreng.) Magnus

Najas guadalupensis, or southern naiad, is a common plant of the southern and central United States. Prior to 1926, this species was found at nine sites in New England. Five of these sites were in Massachusetts.

Four new locations, and the previously reported area of H. K. Svensen from Oyster Pond, Falmouth, Massachusetts, were located. Plants of *Najas guadalupensis* were found in waters of medium alkalinity (15.1–60.0 mg/l CaCO₃, Hellquist, 1975) as compared to the alkaline waters (> 60.0 mg/l CaCO₃) outside of New England (Tables 1 & 2). Oyster Pond is brackish with a chloride reading of 1201.2 mg/l, indicating a tolerance of this species to higher salt content.

Najas guadalupensis was extremely common, forming weedy areas in Lake Waban, Massachusetts, Bantam Lake and Graniss Pond, Connecticut. Matthew Hickler, a student at the University of New Hampshire, discovered *N. guadalupensis* at Violin Pond, Wellesley, Massachusetts, during the summer of 1975. Upon visiting this pond during 1976 I did not find it. There were extensive stands of *N. flexilis* (Willd.) Rostk. & Schmidt present. Downstream from Vio-

lin Pond on the west side of Lake Waban *N. guadalupensis* was extremely abundant in approximately one meter of water. This population should be closely checked since Lake Waban drains into the Charles River, where it could become a problem as a water weed.

COLLECTION LOCATIONS: **Massachusetts:** NORFOLK CO.: Lake Waban, Wellesley, 11668; Violin Pond, Rt. 135, Wellesley, *Matthew Hickler*, 18 September 1975. **Connecticut:** NEW HAVEN CO.: Graniss Pond, East Haven, 8596; LITCHFIELD CO.: Bantam Lake, Morris, 8587.

***Najas minor* All.**

Discovered in the Hudson River, New York, in 1934 by Muen-scher and Clausen, this European naiad has become very common in many locations along the Hudson River and west into Illinois (Meriläinen, 1968). The first record for this plant in New England was collected by William Countryman in Lake Champlain at Red Rock Bay, West Haven, Vermont, during 1965. It was misidentified as *Najas gracillima* (A. Br.) Magnus, with which it is often mistaken.

Najas minor was located for the first time in Massachusetts during the summer of 1974 at Lily Brook and Stockbridge Bowl, Stockbridge. At both locations the plant was extremely common and quite weedy. These sites were revisited in 1975, and *N. minor* was found only in Lily Brook. Directed at *Myriophyllum spicatum* L., a weed control program at Stockbridge Bowl has checked the spread of *N. minor*.

COLLECTION LOCATIONS: **Massachusetts:** BERKSHIRE CO.: Lily Brook east of Mah-keenac Rd. and Stockbridge Bowl, Stockbridge, 9688; Stockbridge Bowl near inlet of Lily Brook, Stockbridge, 9687.

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